ATOMIC ENERGY newsletter

THE FIRST AND ONLY [illegible]

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Dear Sir:

The Navy announced in Washington last week that it expected to complete its nuclear powered submarine by 1954. It said that the keel for the submarine, to be built by the Electric Boat Co., Groton, Conn., will be laid this Spring. The nuclear reactor, which will be used to propel the undersea craft, is a joint project of Argonne National Laboratory, Chicago, and the Westinghouse Electric Company. General Electric Company are also engaged in activities connected with a nuclear reactor for propulsion of a water-borne craft; their work centers at Knolls Atomic Power Laboratory, Schenectady, N.Y.

Under authority of a liberalizing amendment to the Atomic Energy Act recently enacted, the USAEC is preparing recommendations for the exchange, with friendly countries, of certain atomic information (excluding data on the design and fabrication of atomic weapons). The recommendations will be put before Congress in January. The USAEC is also at work on a plan for an expansion of its whole weapons production program (see page 2; this LETTER). The thought is to present this plan to the Joint Congressional Committee on Atomic Energy which has requested such a study by January 3rd, or soon afterward. There will also be a new series of atomic weapon tests, this coming Spring, which presumably will involve new explosives that still are in the development stage. According to Gordon Dean, USAEC Chairman, and his colleagues, who revealed this and other information in Washington last week, the two atomic test periods in Nevada this year had developed "information about the design of weapons" that was being carried forward now.

The fourth conference on Electronic Instrumentation and Nucleonics in Medicine will be held Jan. 7-8, 1952, in the Hotel Commodore, New York, under the aegis of the American Institute of Electrical Engineers. The first day of the conference will be devoted to nucleonic applications to medicine, including X-rays, gamma rays, and tracers. The second day concerns electric circuit theory in the study of the circulatory and respiratory systems, and electronic techniques in anaesthesia. Papers on nucleonics will include "Development of the Phosphor-Phototube Combination as a Reliable Radiation Detector", by Westinghouse staff people; "A Unique Instrument for Precise Measurement of Gamma Radiation" by Philip E. Ohmart, Cincinnati; "Fluorescent Crystal Counting in Medical Tracer Research", by Hal O. Anger, University of California, Berkeley; "A Cobalt-60 Irradiator for Teletherapy", by E. Dale Trout and John Vlach, General Electric Co., Milwaukee; and "Scintillation Counting for Brain Tumor Localization", by Bertram Salverstone, M. D., Tufts College Medical School, and W. S. MacDonald and W. E. G. Eustis, of the W. S. MacDonald Co., Boston.

Sumner T. Pike, USAEC Commissioner, has now resigned, effective Dec. 15th. Mr. Pike had served on the USAEC for more than five years, and was the only remaining member of the original five-man commission. This original Commission, impaneled in 1946, was composed of David E. Lilienthal, Lewis L. Strauss, William W. Waymack and Robert F. Bacher.

Subscription rates: United States, U.S. possessions, and Canada, $18.00 a year. Latin America, $20.00 a year. All other countries, $25.00 a year.

ATOMIC ENERGY AND THE INDUSTRIAL MOBILIZATION PROGRAM;
A special digest of remarks by Gordon Dean, Chairman, USAEC, before the American Ordnance Association, New York, N.Y., Dec. 5, 1951.

Let us see where the atomic energy program fits into the industrial mobilization picture. Dollar-wise, it does not amount to very much. Of the 100 billion appropriated for the procurement of hard goods and construction since Korea, for example, only about 2 billion has been earmarked for similar expenditures for the atomic energy enterprise. The bulk of this is being spent on a substantial expansion program which is now under way. Actually, this is the USAEC's second major expansion effort. The first one, consisting of projects begun in 1949, involved mainly a 300 million dollar expansion in the productive capacity of the Hanford plutonium plant, and a 220 million dollar expansion in the productive capacity of the Oak Ridge uranium separation plant. The main ingredients of the current program--the second--are a huge new plant at Aiken, S. C., (hydrogen bomb materials) which eventually will cost more than a billion and a quarter dollars, and a new 500 million dollar plant at Paducah, Ky.

Right now, the USAEC and Department of Defense are working on plans for still another expansion of the atomic energy productive capacity of the U.S.

There are, however, certain factors which limit the overall size of the atomic energy program:

1.-The uranium supply. 2.-The state of the art. The military services determine the types and quantities of atomic weapons they need, and here they are naturally limited by the status of atomic weapons technology at any given time. 3.-The effect on the economy. Although the amounts of money we deal in are a relatively small percentage of total defense expenditures, we have a disproportionately large demand for many items that are in critically short supply, including certain categories of both materials and manpower.

Why are we expanding when there are these limitations? There are two answers:

1.-There recently has been a very decided improvement in the uranium supply. This is due to (a) the discovery of new uranium deposits in Canada, (b) the extension of the known uranium-bearing region of the U. S.'s Colorado Plateau, (c) development of improved and more economical methods of extracting uranium from lower-grade ores, and (d) the conclusion of an agreement whereby the U. S. and Great Britain have been given access to the very large stores of uranium which occur as a minor constituent in the residues of gold production in the Union of South Africa.

2.-The second principal reason why a further expansion of the atomic energy program is now being considered is that recent technological developments have taken place which now make possible the consideration of atomic weapons for tactical as well as strategic employment. These additional new uses obviously tend to raise the demand for numbers of atomic weapons.

(As to our use of critical materials: We now use 7% of all nickel produced in the U. S., and this rate will increase next year even if no further expansion occurs; we use 5% of all sulfur produced in the U. S.; we use 50% of the total national production of stainless steel tubing, and our peak has not been reached; we use 2% of the total national supply of electrical power, and the demand will increase enormously as new plants now under construction start up.)

As to our uses of manpower: Of the 12,000 physicists in the U. S., 1,200 work directly for the atomic energy program. Some are in basic and others in applied research. Construction labor is also a factor, Of the about 3 million people currently comprising the labor force of the United States, about 52,000 are now working for the USAEC, and even without another expansion program, our demand will increase still further with time. At the Savannah River plant alone, the force will exceed 40,000.

What will we be doing if and when we expand the atomic energy program? Physically, we will be enlarging an industrial and scientific enterprise in which the capital investment already amounts to something like 2½ billion dollars, and in which this investment will eventually climb to around 5 billion dollars on the basis of the expansion program now under way. The operating cost of this business --as distinct from the construction costs--will amount to around 600 million dollars in the current fiscal year.

RAW MATERIALS...radioactive minerals for nuclear work...

UNITED STATES-Colorado: New uranium discoveries have been made in the Uncompahgre and Red Mountain mining districts of Ouray and San Juan counties by the U.S. Geological Survey, in investigations made for the USAEC. The finds are more than 100 miles southwest of similar recent finds near Leadville, in central Colorado. Although none of the finds show possibilities for commercial production, they are significant since they disclose a new area that is a potential source of radioactive material. Uranium minerals were found in black slate beds cropping out of Uncompahgre Canyon, south of Ouray near Bear Creek Falls; in the lead-silver mines north of Ouray, and in volcanic rock of the Red Mountain district.....Diamond drilling, for which bids were recently received by the USAEC in Grand Junction, is to be performed in the Eastern Carrizo Mountains area in Arizona and New Mexico. A minimum of 60,000-feet, and a maximum of 100,000-feet, comprise the work to be done.....Moab, Utah: A topographic survey of the area west of Moab, between the Colorado and Green rivers, is now to be made by the U. S. Geological Survey. The work is being done by the USGS on behalf of the USAEC to speed development of the recently discovered uranium deposits of the Grand county and adjacent districts. In addition to the area between the rivers to be surveyed, a large territory west of Blanding, in White and Red canyons and surrounding areas, will also be covered by the party.

CANADA-A new phase of development is now getting under way in the uranium fields of Northern Saskatchewan. With major new finances coming in, a number of properties which have seen several years of field exploration, are about to be brought under intensive development. Some half-dozen deals are now under negotiation, with several of the largest mining organizations on the continent stepping into the picture. It is believed that planned expenditures will more than match the $8½ million being spent by Eldorado Mining and Refining to bring its big Ace and Fay mines into production. Several of the companies will be initiating underground work. One of the new companies is St. Joseph Lead, which has had engineers in the area for some time. It is understood that this mining organization will take over the financing and operation of at least two properties, Amax Athabasca Uranium Mines and that of the adjoining Aurora Uranium and Gold Mines, with negotiations under way for a third closely allied property. Climax Molybdenum is also understood to be negotiating for a property. Among the big Canadian organizations getting into this new mining field is Mining Corp., through its recent option on the property of Cinch Lake Uranium Mines. Additionally, several large gold mining companies are beginning to show interest.

NEW PRODUCTS, PROCESSES & METHODS...for nuclear work...

Five calibrated beta emitting reference sources, covering the energy spectrum range of the majority of beta emitting radioisotopes from 0.155 Mev to 2.5 Mev. Each of the sources emits approximately 50 to 100 detectable counts per second under most standard counting methods. Provide a convenient method of determining the beta efficiency over a considerable range of radiation detection units, such as Geiger tubes, scintillation phosphors, electroscopes, etc. --Atomic Instrument Co., Cambridge 39, Mass.

New instrument that detects and records gamma radiations in an area and sounds an alarm when average tolerance limits are exceeded. Called an area health monitor, the device provides instantaneous indication of radiation, total radiation received in any preset period, and a thirty-day integrated record of the radiation present in the immediate vicinity of the detector in fifteen-minute intervals. It also contains a means of telemetering the rate of radiation to remotely located indicating stations. Standard equipment consists of an air wall ionization chamber, a d-c amplifier, and a six-foot instrument panel that incorporates a torque-balance converter, a watt hour-meter mechanism, a rate indicator, a cyclometer counter, and a recording device. Range is ½ to 5 times tolerance, figuring tolerance at 6.25 mr/hr; instrument is said to have an over-all plus or minus accuracy of 10%.--Meter & Instrument Dep't., General Electric Co., Schenectady, N.Y.

IONIZING RADIATION...investigations & notes...

The role of citrus flavonoids in radiation therapy on malignant growths was outlined before the Radiological Society of North America at its annual meeting in Chicago last fortnight, by Dr. Isidore M. Arons, director of the Department of Radiation Therapy, Harlem Hospital, New York. According to Dr. Arons, tests made over the past two years at Harlem Hospital indicate that cancer patients can stand heavier doses of X-rays if they are given the citrus flavonoid therapy. (The basic role of the citrus flavonoids, the so-called vitamin P, is the protection of capillaries and the prevention of dangerous bleeding.)

The result of a survey conducted by Argone National Laboratory, in an attempt to learn the fate of several thousand persons estimated to have received radium-treated medicines here and abroad about 25 years ago, was also outlined to the Society (as above). In the Chicago area, the Argonne investigators (Drs. W. B. Loomey, A. M. Brues, R. J. Hasterlik, and L. D. Marinelli, a biophysicist) found thirty-six radium-treated patients. Only one of this group developed cancer, although some are said to be carrying several hundred thousand times the normal amount of radium naturally present in humans. One objective of this study, which is sponsored by the USAEC, is to learn at what levels radium deposited in the bones may excite the growth of malignant tumors.

Schwarz Laboratories, New York, will investigate the biochemical properties of glutathione, under a contract recently awarded that firm by the Office of Naval Research. Glutathione, a respiratory carrier of oxygen, is of special interest because of its prophylactic action in certain animals against radiation. The new Schwarz project will consist of growing yeast, a source of glutathione, on a nutrient medium containing radioactive sulfur. The yeast cells, utilizing some of the radio-isotope, will produce labeled glutathione, which can then be extracted and used for animal experimentation. (It is believed that glutathione exerts its protective action against radiation injury by aiding in the regeneration of vital blood-forming organs.)

A study will be undertaken by the University of Texas of the effects of various radiations on bacteria, fungi, virus, fruit flies, and oats and other plants, under a USAEC research contract recently awarded the University. Dr. Wilson S. Stone, professor of zoology, will supervise the project. Ultraviolet rays, X-rays, alpha rays, neutrons, and other atomic particles will be included in radiations used in the experiments. Many radiations to be employed will be supplied by the University's new Van de Graaff electrostatic generator, now under construction at the Off-Campus Research Center of the University.

NEW BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Tenth Semi-Annual Report of the USAEC. Major activities of the USAEC for Jan.-June 1951 are summarized under weapon tests, military applications, raw materials, production reactor development, physical research programs, isotope programs, biology and medicine, manpower and labor relations, finance and business management, etc. 151 pages.--Superintendent of Documents, Washington 25, D.C. (45)¢

The Theory of Isotope Separation as Applied to the Large Scale Production of Uranium-235. Part of the National Nuclear Energy Series; III-1B. Manhattan Project Technical Section, Karl Cohen. Edited by G. M. Murphy. 165 pages. McGraw-Hill Book Co., New York 18 ($2.00)

Phosphates and Polyphosphates of the Rare Earths and Thorium, by A. G. Buyers and L. F. Audrieth, Univ. of Illinois, Urbana. Results of a study made of the phosphates and polyphosphates of the rare earths and thorium using a number of different experimental approaches. 92 pages.--Library of Congress, Photoduplication Services, Washington 25, D.C. (Microfilm: $4.25. Photostat: $12.40)

NOTES- Reprints of "A Popular Lecture on Civil Defense", and "Civil Defense Talks to Hospital Personnel" are available from Otto Eisenchiml, Scientific Oil Compounding Co., 1637 So. Kilbourne Ave. , Chicago 23. According to Mr. Eisenschiml, who is chairman of the Chemical Warfare Consulting Committee of the Chicago Civil Defense Corps, the material may be found useful as presentations on this subject to the lay public.

ATOMIC PATENT DIGEST...latest U. S. grants & applications...

Radioactive source. Comprises a supporting block formed of a material not readily broken down by prolonged bombardment from radioactive materials, and provided with a flat surface; a deposit of a radioactive material on a portion of this flat surface; a thin sheet of sealing material covering this surface and a deposit of radioactive material to form a sealing layer transparent to the spectrum of radiation from this deposit of radioactive material; a casing, formed of materials capable of standing prolonged bombardment from radioactive material, containing the supporting block, sheet of sealing material, and deposit of radioactive material, and with an aperture over this deposit of radioactive material. U. S. Pat. No. 2,575,134 issued Nov. 13, 1951; assigned to General Electric Company, New York.

Counter chronograph. A timing circuit comprising a one-shot multivibrator, an electronic counting circuit, a clamping circuit, and means for deactivating the clamping circuit for an interval determined by the successive occurrence of two input pulses. U. S. Pat. No. 2,575,759 issued Nov. 20, 1951; assigned to United States of America (USAEC).

Preparation of heavy metal borohydrides. The process of preparing zirconium borohydride, which comprises reacting under an inert atmosphere sodium-zirconium fluoride with aluminum borohydride. U. S. Pat. No. 2,575,760 issued Nov. 20, 1951; assigned to United States of America (USAEC).

NOTES: A free, irrevocable, and unlimited license has been granted by E. I. du Pont de Nemours and Company to the Government and People of the United States on U. S. Pat. No. 2,162,178 (issued June 13, 1939), an X-ray shielding compound. This comprises a plastic material composed principally of lead powder and hand-moldable at room temperatures, useful in various forms of X-ray treatment to confine the rays to the area treated.

A group of radiological warfare weapons, developed by Jack De Ment, De Ment Laboratories, Portland, Oregon, during the past 6 years, are the subjects of several patent applications made by De Ment and assigned to the United States of America (USAEC). They comprise: (1) Radioactive toxic incendiary composition; serial 732,919 filed March 6, 1947. Radioactive fires which leave radioactive ash and craters as well as yield radioactive smoke are produced by incendiaries which carry radioactive fission products. Half or more of the payload of an incendiary missile may comprise radioactive poison. Burns from a radioactive incendiary pose great medical problems; a highly radioactive fire is fought only with very great difficulty and danger. (2) Radioactive toxic chemical warfare agents; serial 729,875 filed Feb. 20, 1947. Radioactive warfare gases possess such novel characteristics that in certain ways they may rival or exceed atomic explosives. Phosgene, lewisite, mustard, adamsite, chloropicrin, and other warfare agents carry radioactive atoms in their make-up or are admixed with radioactive matter. Radioactive chlorine, arsenic, mitrogen, sulfur and other elements are used; the radioactive warfare agent possesses many qualities superior to the agent in its usual non-radioactive form. (3) Method and composition for smoke production; serial 240,069 filed July 27, 1951. Comprises a composition which burns and releases a radioactive smoke; composed of four components --a fuel, an oxidant, a halogen donor material, and a halogen receptor substance. (4) Producing radioactive aerosols; serial 727,477 filed Feb. 10, 1947. A radioactive mist is dispersed by a gas under pressure. (5) Radioactive and radioactive toxic ammunition; serial 735,144 filed Mar. 17, 1947. Includes such munitions as explosive bombs, shells of various kinds, certain pyrotechnic weapons, land and sea mines, torpedoes, etc., combined with a radiological warfare agent. It is distinguished from atomic explosives of the fission or fusion kinds and may possess a variety of characteristics, such as throwing radiological warfare agent carrying shrapnel, etc.

Sincerely,

The Staff,
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